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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/724,146

11/28/2000

Mike Binnard

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03/29/2004

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EXAMINER

STOCK JR, GORDON J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/724,146

Applicant(s)

BINNARD ET AL.

Examiner

Gordon J Stock

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-13, 16-30 and 32-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-13, 16-30, 32-38, 43 and 44 is/are rejected.
- 7) ☒ Claim(s) 39-42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-5, 7-13, 16-30, 32-34** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)** in view of **Nara et al. (5,523,841)** and **Yao (6,057,921)**.

As for **claims 1-5, 7-13, 16-30, 32-34**, Nishi in a projection exposure apparatus discloses a moveable stage for a wafer; a moveable reticle stage, a secondary stage, that suggests having x-mirror and y-mirrors with three interferometric measurement systems for the reticle stage; a wafer stage with a plurality of fiducial marks and three interferometric measurement systems with an x and y mirror. As for a controller that utilizes the marks to determine the positions of the respective mirrors, Nishi discloses a main control system (Fig. 7, 114) and discloses that the system finds the positions of the mirrors and marks in relation to each other for reticle alignment with the substrate (col. 5, lines 5-45). As for first and second detectors, Figs. 1, 7, 8 demonstrate at least two alignment detection schemes.

As for a secondary x-mirror, Nishi is silent. However, Yao in a two piece mirror arrangement for interferometrically controlled stage teaches a secondary x-mirror comprising one of the sides of the y-mirrors for proper calibration of the mirrors and to adequately determine their positions relative to each other (Fig. 2; col. 3, lines 5-35). And Nara in a distance measuring apparatus teaches using two x-mirrors rather than one to enlarge the area within which

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the x-y stage moves without enlarging the dimensions of the movable mirrors with two x interferometric systems for each mirror (col. 2, lines 10-30; Fig. 2).

Therefore, it would be obvious to one skilled in the art at the time the invention was made to have two x-mirrors in order to provide more freedom of movement for the stage and to have a secondary x-mirror be part of the y-mirror to adequately calibrate each mirror's position in relation to each other.

3. **Claim 35** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)** in view of **Nara et al. (5,523,841)** and **Yao (6,057,921)** further in view of **Ueda (5,417,408)**.

As for **claim 35**, see **claim 13**. They are silent about cantilevers. However, Ueda in a stage teaches using cantilevers for movement (col. 3, lines 30-40). Therefore, it would be obvious to one skilled in the art to have the stage comprise cantilevers in order for the stage to move.

4. **Claim 36** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)** in view of **Nara et al. (5,523,841)** and **Yao (6,057,921)** further in view of **Nishi (WO 200022376)**.

As for **claim 36**, see **claim 13**. In addition, Nishi discloses a plurality of fiducial marks (Fig. 23) and two 2-dimensional fiducial marks (Fig. 2). However, he is silent concerning three 2-dimensional marks. Nishi in a shape measuring method and device teaches using six 2-dimensional reference marks for better alignment (Fig. 2). Therefore, it would be obvious to one skilled in the art at the time the invention was made to have more than two 2-dimensional fiducial marks to improve accuracy of alignment.

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5. **Claims 37-38, 44** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)** in view of **Nara et al. (5,523,841)** and **Yao (6,057,921)** further in view of **Matsui (6,404,505)**.

As for **claims 37-38**, see **claim 13**. In addition, Fig. 2 suggests that mirrors are used with the reticle stage's interferometric systems. However, Nishi does not disclose suggest a secondary x-mirror for the reticle stage. As for a secondary x-mirror, Nishi is silent. However, Yao in a two piece mirror arrangement for interferometrically controlled stage teaches a secondary x-mirror comprising one of the sides of the y-mirrors for proper calibration of the mirrors and to adequately determine their positions relative to each other (Fig. 2; col. 3, lines 5-35). And Nara in a distance measuring apparatus teaches using two x-mirrors rather than one to enlarge the area within which the x-y stage moves without enlarging the dimensions of the movable mirrors with two x interferometric systems for each mirror (col. 2, lines 10-30; Fig. 2).

Therefore, it would be obvious to one skilled in the art at the time the invention was made to have two x-mirrors in order to provide more freedom of movement for the stage and to have a secondary x-mirror be part of the y-mirror to adequately calibrate each mirror's position in relation to each other.

In addition, Matsui in a positioning stage system teaches using two x-mirrors for reticle stage to substrate stage alignment (Fig. 1). Therefore, it would be obvious to one skilled in the art at the time to have a secondary x-mirror for proper alignment between a reticle stage and substrate stage.

As for **claim 44**, Nishi discloses a plurality of two-dimensional marks (RM1 and RM2 of Fig. 2).

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6. **Claim 43** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nishi (5,243,195)** in view of **Nara et al. (5,523,841)** and **Yao (6,057,921)** further in view of **Matsui (6,404,505)** and further in view of **Ueda (5,417,408)**.

As for **claim 43**, see **claim 37**. They are silent about cantilevers. However, Ueda in a stage teaches using cantilevers for movement (col. 3, lines 30-40). Therefore, it would be obvious to one skilled in the art to have the stage comprise cantilevers in order for the stage to move.

Allowable Subject Matter

7. **Claims 39-42** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 39**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure apparatus a replacer that replaces the first and second movable stages with respect to the first and second position detectors, in combination with the rest of the limitations of **claims 39-42**.

Response to Arguments

8. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. As for the allowable subject matter as set forth in the prior office action, the Examiner apologizes for the inconvenience caused by the grounds of rejection, but after performing an updated search, the Examiner found new grounds of rejection for the claims.

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Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

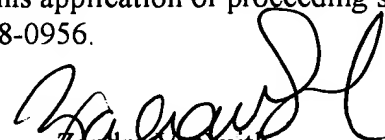
Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


gs

March 21, 2004


Zandra V. Smith
Primary Examiner
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